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South Florida microfungi: *Linkosia longirostrata*, a new hyphomycete on paurotis palm

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Abstract — *Linkosia longirostrata* sp. nov. is described and illustrated from rachides of dead leaves of *Acoelorrhaphe wrightii* collected in southeastern Florida, U.S.A. The fungus is distinct in having no or very reduced 1–2-septate conidiophores, smooth or slightly verrucose determinate or occasionally percurrent conidiogenous cells, and narrowly obclavate to long obclavate rostrate finely roughened 9–18-distoseptate conidia with 0–2 dark brown constrictions and a long slender straight rostrum with 0–5 intercalary nodular swellings. Differences and similarities with morphologically similar *Linkosia* species are discussed.

Key words — anamorphic *Ascomycota*, palm fungi, *Sporidesmium*, taxonomy

Introduction

While examining collections of dead plant debris from south Florida, several interesting *Sporidesmium*-like taxa were found colonizing decaying parts of native or introduced palm trees. One clearly fits within *Linkosia* A. Hern.-Gut. & B. Sutton (Hernández-Gutiérrez & Sutton 1997, Wu & Zhuang 2005) in having distoseptate conidia and very reduced or absent conidiophores. After a detailed comparison with previously described *Linkosia* species, the fungus was found to differ in several morphological features and therefore is described here as new.

Materials & methods

Samples of dead leaves of *Acoelorrhaphe wrightii* (Griseb. & H. Wendl.) H. Wendl. ex Becc. (paurotis palm; *Arecaceae*) were collected from a forested area in central Broward County, Florida, U.S.A., in 2010. The samples were cut into small pieces and placed in plastic bags for later processing and examination according to Cannon & Sutton (2004). Fungal structures were mounted in lacto-cotton blue and 100 measurements were made at 1000× magnification whenever possible. Minimum, maximum, 5th and 95th percentiles were calculated for all measurements using Microsoft Excel 2007, with

extreme values given in parentheses when different from percentiles. Microphotographs were taken using an Olympus BX-45 microscope and edited using Adobe Photoshop. The type specimen and other specimen including semi-permanent slides are deposited in the Herbarium of the U.S. National Fungus Collections (BPI).

Taxonomy

Linkosia longirostrata G. Delgado, **sp. nov.** PLATE 1

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Differs from *Linkosia coccothrinacis* in having very reduced 1–2-septate conidiophores, occasionally percurrent conidiogenous cells, and larger finely roughened long obclavate-rostrate conidia with more distosepta and a rostrum with 0–5 intercalary nodular swellings.

TYPE — U.S.A. Florida, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°06′25″N 80°13′19″W, on rachides of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (**Holotype**: BPI 884152H).

ETYMOLOGY — *longirostrata*, from the Latin *longus* (long) and *rostratus* (beaked), referring to the long conidial rostrum

COLONIES effuse, hairy, brown. MYCELIUM superficial, composed of branched, septate, pale brown to brown hyphae, 2–3 µm wide. CONIDIOPHORES absent or very reduced, erect, straight, 1–2-septate, dark brown, often with a lobed base, 19–30(–37) µm long, 7–15 µm wide at base. CONIDIOGENOUS CELLS monoblastic, integrated, terminal, determinate or occasionally percurrent, solitary, simple, subcylindrical or lageniform, smooth or slightly verrucose, tapering toward the truncate apex, brown to dark brown, 13–22 × 6–11 µm, 3.5–5 µm wide at the apex, with 0–1 ampulliform, brown, rarely 1-septate proliferation. CONIDIAL SECESSION schizolytic. CONIDIA holoblastic, straight or slightly curved, narrowly obclavate to long obclavate rostrate, 9–18-distoseptate with 0–4 pigmented distosepta, pale brown, darker toward the apex, sometimes with 0–2 dark brown constrictions, finely rough, (73–)91–158(–172) µm long (including rostrum), 6.5–12 µm wide; basal cell cylindrical or conico-truncate, dark brown to blackish brown, 6–11 × 3.5–5 µm; rostrum slender, straight, pale brown to brown, subhyaline at the tip, ≤82 µm long, with 0–5 intercalary, nodular swellings, 3–5 µm wide. TELEOMORPH unknown.

ADDITIONAL SPECIMEN EXAMINED — U.S.A. Florida, Broward Co., Plantation, Plantation Heritage Park, Anne Kolb Memorial Trail, 26°06′25″N 80°13′19″W, on rachides of dead leaves of *Acoelorrhaphe wrightii*, 30.V.2010, coll. G. Delgado (BPI 884154H).

Discussion

Hernández-Gutiérrez & Sutton (1997) introduced *Linkosia* in the context of a morphology-based reassessment of *Sporidesmium* Link that emphasized conidial septation, conidiophore presence or absence, and conidiophore proliferation (Subramanian 1992). The type species, *Sporidesmium coccothrinacis*

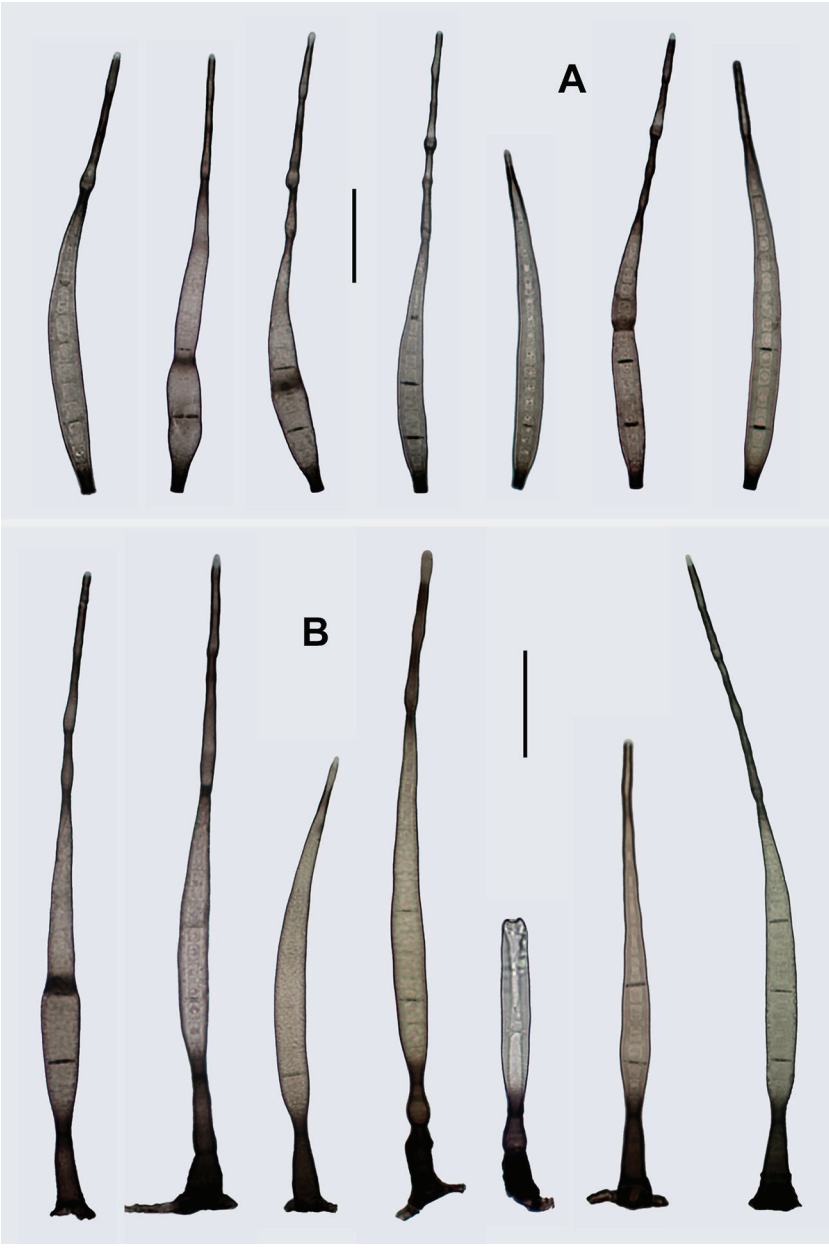

Plate 1. *Linkosia longirostrata* (holotype, BPI 884152H): A. Conidia. B. Conidiophores, conidiogenous cells with or without proliferations, and mature and immature conidia. Scale bars = 30 µm.

A. Hern.-Gut. & J. Mena (≡ *Linkosia coccothrinacis;* Hernández-Gutiérrez & Sutton 1997), is a peculiar hyphomycete characterized by conidiophores reduced to a single monoblastic conidiogenous cell and distoseptate conidia (Hernández-Gutiérrez & Mena 1994). Subsequently, nine additional species have been described or transferred to the genus based on differences in conidial morphology including shape, number of distosepta, dimensions, wall texture and presence or absence of apical appendages (Almeida et al. 2014, Castañeda et al. 2000, Ma et al. 2011, Wu & Zhuang 2005, Zhang et al. 2009). Multigene-sequence data indicate that *Linkosia*, as well as other morphologically circumscribed *Sporidesmium*-like genera, are polyphyletic (Shenoy et al. 2007, Iturriaga et al. 2008). The few phylogenetic studies conducted on this generic complex have revealed the diverse or uncertain affinities of *Linkosia* species within the *Sordariomycetes* (Shenoy et al. 2006, Yang et al. 2010). The genus needs to be redefined in the light of molecular data but very few sequences are currently available in GenBank and one (attributed to *L. fusiformis* W.P. Wu) is apparently a contaminant (Summerbell et al. 2011). For that reason and in the absence of a culture isolate and molecular data, the present fungus is placed in *Linkosia* for diagnostic purposes, following the traditional morphological approach.

Linkosia longirostrata is morphologically unique among *Linkosia* species. Conidiogenous cells, which are slightly verrucose or smooth, are usually determinate but sometimes proliferate percurrently at least once to form an ampulliform proliferation at the apex which can be either 0- or 1-septate, a feature not previously seen in any other *Linkosia* species but present in the morphologically similar genus *Stanjehughesia* Subram. (Castañeda & Kendrick 1990, McKenzie 1995). The conidia are narrowly obclavate but mostly long obclavate rostrate with a long slender straight rostrum where up to 5 nodular swellings form at intervals along its length. These swellings apparently relate to different stages of rostrum elongation. The conidial tip, usually tapering to 1.5–2 µm, widens to 3–5 µm diam. and is at first rounded, after which the rostrum elongates to a certain length, gradually tapers, darkens, and widens again at a further point to form a new swelling, giving the rostrum a knotty appearance. One or two constrictions with a distinct dark brown band are often present at some distosepta, and sometimes the conidium between the constriction and basal cell turns dark brown as well. Also a few distosepta (up to four in certain conidia) appear pigmented and darker than the others. Younger conidia are smooth, but older ones are finely roughened with basal cells that are cylindrical or conico-truncate and distinctly dark brown to blackish brown. *Linkosia coccothrinacis* (A. Hern.-Gut. & J. Mena) A. Hern.-Gut. & B. Sutton (Hernández-Gutiérrez & Sutton 1997), a saprobe on dead leaves of a palm tree found in Cuba, is morphologically similar, sharing dark brown constrictions, a

few pigmented distosepta, and conico-truncate darker basal cells. Its conidia, however, are smaller (43.7–71.5 × 7–10.6 µm) and smooth and have only 4–7 distosepta and a short rostrum without swellings.

Additionally, conidiophores in *L. longirostrata* are absent or present, and when present they are very reduced, usually 1- but occasionally 2-septate and often with a lobed base. Three *Linkosia* species were originally described as producing short 0–2-septate conidiophores: *L. ponapensis* (Matsush.) R.F. Castañeda et al. (Matsushima 1981, as *Sporidesmium ponapense*), *L. refugia* (B. Sutton & Pascoe) D.A.C. Almeida & Gusmão, and *L. canescens* (B. Sutton & Pascoe) D.A.C. Almeida & Gusmão (Sutton & Pascoe 1988, as *Janetia refugia* and *J. canescens*), while the remaining species have only lageniform or ampulliform conidiogenous cells that form directly on the superficial mycelium (Santa Izabel et al. 2013, Wu & Zhuang 2005). *Linkosia ponapensis* is clearly separated from *L. longirostrata* by its cylindrical conidiogenous cells and shorter (34–50(–70) µm) naviculiform conidia with (3–)5–7(–9) distosepta and an apical 6–25 µm long subulate appendage. *Linkosia refugia* is distinguished from *L. longirostrata* by its very rarely branched conidiophores and smaller (31–37 × 7–8 µm) obpyriform 4–6-distoseptate conidia that gradually taper towards an obtuse paler apex but are not distinctly rostrate. In *L. canescens*, conidiogenous cells are mono- or polyblastic, bearing a single or 2–3 denticulate conidiogenous loci per cell; therefore, despite the presence of distoseptate conidia, this fungus is not considered congeneric with *Linkosia* as presently circumscribed and is better retained in *Janetia* M.B. Ellis (Ellis 1976, Goh & Hyde 1996).

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Literature cited

Almeida DAC, Miller AN, Gusmão LFP. 2014. New species and combinations of conidial fungi from the semi-arid Caatinga biome of Brazil. Nova Hedwigia 98: 431–447. http://dx.doi.org/10.1127/0029-5035/2013/0162

Cannon P, Sutton B. 2004. Microfungi on wood and plant debris. 217–239, in: G Mueller et al. (eds). Biodiversity of fungi: inventory and monitoring methods. Elsevier Academic Press, Burlington.

Castañeda RF, Kendrick B. 1990. Conidial fungi from Cuba: II. University of Waterloo Biol. Ser. 33. 61 p.

Castañeda RF, Decock C, Saikawa M, Gené J, Guarro J. 2000. *Polyschema obclaviformis* sp. nov., and some new records of hyphomycetes from Cuba. Cryptog. Mycol. 21: 215–220. http://dx.doi.org/10.1016/S0181-1584(00)01051-4

Ellis MB. 1976. More dematiaceous hyphomycetes. Commonwealth Mycological Institute, Kew.

Goh TK, Hyde KD. 1996. *Janetia curviapicis*, a new species, and an emended description of the genus. Mycologia 88: 1014–1021. http://dx.doi.org/10.2307/3761066

Hernández-Gutiérrez A, Mena J. 1994. *Sporidesmium coccothrinacis* Hernández & Mena, sp. nov. Bol. Soc. Micol. Madrid 19: 313–314.

Hernández-Gutiérrez A, Sutton BC. 1997. *Imimyces* and *Linkosia*, two new genera segregated from *Sporidesmium sensu lato*, and redescription of *Polydesmus*. Mycol. Res. 101: 201–209. http://dx.doi.org/10.1017/S0953756296002419

Iturriaga T, Hawksworth DL, Crane JL. 2008. '*Sporidesmium lichenicola*' sp. nov., a new lichenicolous fungus on *Leptogium* from Venezuela. Mycologia 100: 392–396. http://dx.doi.org/10.3852/06-166R

Ma J, Ma LG, Zhang YD, Zhang XG. 2011. Three new hyphomycetes from southern China. Mycotaxon 117: 247–253. http://dx.doi.org/10.5248/117.247

Matsushima T. 1981. Matsushima mycological memoirs no. 2. Published by the author, Kobe.

McKenzie EHC. 1995. Dematiaceous hyphomycetes on *Pandanaceae*. 5. *Sporidesmium* sensu lato. Mycotaxon 56: 9–29.

Santa Izabel TS, Cruz ACR, Gusmão LFP. 2013. Conidial fungi from the semi-arid Caatinga biome of Brazil. *Ellisembiopsis* gen. nov., new variety of *Sporidesmiella* and some notes on *Sporidesmium* complex. Mycosphere 4: 156–163. http://dx.doi.org/10.5943/mycosphere/4/2/1

Shenoy BD, Jeewon R, Wu WP, Bhat DJ, Hyde KD. 2006. Ribosomal and RPB2 DNA sequence analyses suggest that *Sporidesmium* and morphologically similar genera are polyphyletic. Mycol. Res. 110: 916–928. http://dx.doi.org/10.1016/j.mycres.2006.06.004

Shenoy BD, Jeewon R, Hyde KD. 2007. Impact of DNA sequence-data on the taxonomy of anamorphic fungi. Fungal Diversity 26: 1–54.

Subramanian CV. 1992. A reassessment of *Sporidesmium* (hyphomycetes) and some related taxa. Proc. Nat. Acad. Sci. India B58: 179–190.

Summerbell RC, Gueidan C, Schroers HJ, de Hoog GS, Starink M, Arocha Rosete Y, Guarro J, Scott JA. 2011. *Acremonium* phylogenetic overview and revision of *Gliomastix*, *Sarocladium*, and *Trichothecium*. Stud. Mycol. 68: 139–162. http://dx.doi.org/10.3114/sim.2011.68.06

Sutton BC, Pascoe IG. 1988. Some dematiaceous hyphomycetes from branches and phyllodes of *Acacia* in Australia. Aust. Syst. Bot. 1: 127–138. http://dx.doi.org/10.1071/SB9880127

Wu WP, Zhuang W. 2005. *Sporidesmium*, *Endophragmiella* and related genera from China. Fungal Diversity Press, Hong Kong.

Yang HL, Sun GY, Batzer JC, Crous PW, Groenewald JZ, Gleason ML. 2010. Novel fungal genera and species associated with the sooty blotch and flyspeck complex on apple in China and the USA. Persoonia 24: 29–37. http://dx.doi.org/10.3767/003158510X492101

Zhang K, Ma LG, Zhang XG. 2009. A new hyphomycete species from Guangxi, China. Mycotaxon 108: 123–125. http://dx.doi.org/10.5248/108.123